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BIOGRAPHY.

JAMES JOSEPH SYLVESTER, A. M., LL. D., F. R. S., D. C. L.

BY DR. GEORGE BRUCE HALSTED, AUSTIN, TEXAS.

AN adequate life of James Joseph Sylvester has never been written, and probably never will be while he lives.

The present biography will aim neither at completeness nor even symmetry, since so brief a sketch of so great a man can be of permanent value only by giving what the writer alone knows, or for some particular reason happens to know better than others.

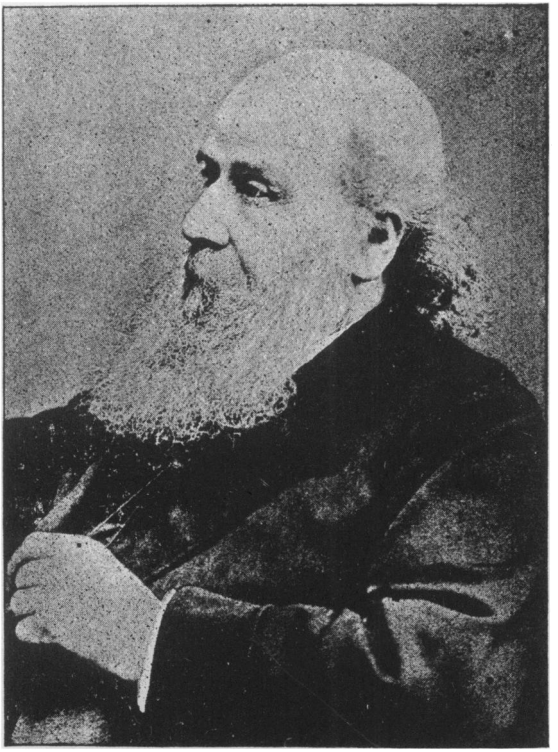
While Sylvester was yet a boy he won a large sum of money offered for the solution of a difficult problem in combinations by a firm who actually wished to use the solution in their business. Partly on the strength of this he went to Cambridge and though not regularly trained for the great tripos examinations, he came out Second Wrangler in the class of which Griffin was first and the celebrated George Green was fourth wrangler.

As he would not sign the thirty-nine articles of the Established Church, he was not allowed to take his degree, nor to stand for a Fellowship, to which his rank in the tripos entitled him. Sylvester always felt bitterly this religious disbarment.

His denunciation of the narrowness, bigotry, and intense selfishness exhibited in these creed tests was a wonderful piece of oratory in his celebrated address at the Johns Hopkins University.

The writer will never forget the emotion and astonishment exhibited by James Russel Lowell while listening to this unexpected climax.

Some of Sylvester's first published work was done about this time on the mathematics of Fresnel's optical theory and was incorporated into a text-book



JAMES JOSEPH SYLVESTER, A. M., LL. D., F.R.S.,D.C.L.

by his class-mate Griffin who had the very highest opinion of Sylvester's originality and power. He was soon appointed to a professorship in London, from which place he was called to America by the University of Virginia.

The cause of his sudden abandonment of the University of Virginia the writer has often heard related by the Rev. Dr. R. L. Dabney as follows: In Sylvester's class were a pair of brothers, stupid and excruciatingly pompous. When Sylvester pointed out one day the blunders made in a recitation by the younger of the pair, this individual felt his honor and family pride aggrieved, and sent word to Professor Sylvester that he must apologise or be chastized.

Sylvester bought a sword-cane, which he was carrying when waylaid by the brothers, the younger armed with a heavy bludgeon.

An intimate friend of Dr. Dabney's happened to be approaching at the moment of the encounter. The younger brother stepped up in front of Professor Sylvester and demanded an instant and humble apology.

Almost immediately he struck at Sylvester, knocking off his hat, and then delivered with his heavy bludgeon a crushing blow directly upon Sylvester's bare head.

Sylvester drew his sword-cane and lunged straight at him, striking him just over the heart. With a despairing howl, the student fell back into his brother's arms screaming out "I am killed"! "He has killed me". Sylvester was urged away from the spot by Dr. Dabney's friend, and without even waiting to collect his books, he left for New York, and took ship back to England.

Meantime a surgeon was summoned to the student, who was lividly pale, bathed in cold sweat in complete collapse, seemingly dying, whispering his last prayers. The surgeon tore open his vest, cut open his shirt, and at once declared him not in the least injured. The fine point of the sword cane had struck a rib fair, and caught against it, not penetrating.

When assured that the wound was not much more than a mosquito-bite, the dying man arose, adjusted his shirt, buttoned his vest, and walked off, though still trembling from the nervous shock. Sylvester was made head professor of mathematics of the Royal Military Academy at Woolwich, a position which he held until the early period set by the English military laws for conferring the life-pension.

He thus happened to be free to accept a position at the head of mathematics in the Johns Hopkins University at its organization. With British conservatism, he stipulated that his traveling expenses and annual salary of five thousand dollars should be paid him in gold, and this fixed, he came a second time to America.

The fame of his coming preceded him, for by this time he was ranked by Kelland in the Encyclopaedia Britannica as the very foremost living English mathematician. The only possible sharer of this proud preeminence was his life-long friend Cayley.

Just at this time there was held in New York an Intercollegiate Mathematical Contest open to all the colleges of America, with Peter S. Michie of

the Army and Simon Newcomb of the Navy as examiners, in which the writer representing Princeton, won a prize of two hundred dollars, and Thomas Craig of Lafayette received honorable mention. Perhaps largely on the strength of this, we were both appointed among the first twenty fellows at the organization of the Johns Hopkins University. The writer having an intense desire to study Sylvester's own creations with him, became alone his first class in the new University. Sylvester gives in his celebrated address a graphic account of the formation of that first-class as illustrating the mutual stimulus of student and professor.

The text-book was Salmon's Modern Higher Algebra, dedicated to Sylvester and Cayley as made up chiefly from their original work.

The professor broke every rule and canon of the Normal Schools and Pedagogy, yet was the most inspiring teacher conceivable. Every thing, from music to Hegel's metaphysics, linked into the theory of Invariants, combined with the precious personal data, and charming unpublished reminiscences of all the great mathematicians of the preceding generation.

Such a course in the creation of modern mathematics, with most precious, elsewhere unattainable, historic indications, will perhaps never be paralleled. It went on not only at the appointed hours, but the professor would send for his class late at night, while at other times they took excursions together to Washington. The incidents of those two formative years spent by the writer in most intimate association with one of the great historic personages of science can never be forgotten. It was during this period that Sylvester founded the American Journal of Mathematics, and it is due to his particular wish that it was given the quarto form.

Then began a new productive period in his life, the astounding activity and marvelous results of which can be faintly estimated by consulting the pages upon pages taken up in the Johns Hopkins Bibliographia Mathematica merely to enumerate the title of the memoirs and papers produced. The entire space devoted to this sketch would be inadequate even to begin any critical estimate of his work. The very complete and profound historic and bibliographic account of the theory of Invariants given by Meyer in the Berichte of the deutche mathematische Gesellschaft indicates very fairly Sylvester's final place in the history of that all-pervading subject. His original contributions to many other parts of the vast structure of modern pure analysis are of nearly as great weight.

But throughout his whole life and work Sylvester is an algebraist, an analyst, as distinguished from a geometer; in this respect contrasting sharply with his friend and admirer Professor Clifford, who conceived of everything in terms of space, and was even able to work synthetically in non-Euclidean space.

Professor Sylvester speaks and writes French with perfect freedom, and it is characteristic that certain of his memoirs prepared for German Journals were written in French.

His personal character is of the very highest, without blemish; and of

his aimiability the writer has experienced repeated proofs. No one now doubts that his second advent on this continent begins the present period of mathematical awakening in America, and that he contributed more to the present upheavel of pure science here than all preceding forces combined. Yet some of his pupils and colleagues have declared that he was a poor teacher; and it is possibly true that he would have made a poor *school-teacher*.

But as President Stanley Hall's article in the Forum so well sets forth, no teaching for a real university can be ranked high which is not vitalized by abundant original creative work.

Sylvester himself was so completely of this opinion as to assert that if a mature man who had produced little or no original work applied for a professorship in a university, he must be either a contemptible ignoramus or a selfish hypocrite and an enemy to mankind.

Moreover he maintained that it was the plain duty of any mature man holding a professorship in a real university to resign at once if he had not already been copiously and creatively productive.

He believed that without unceasing original research and published original work there could be no real university teaching, and that any university professor who, without such a basis, pretended to be a good teacher, was, consciously or unconsciously, a selfish fraud.

Sylvester never married, and what he particularly missed in America was the Athenaeum Club. He has told the writer he would rather give up the Royal Society than the Athenaeum Club. When on the death of his friend, the justly admired Henry J. Stephen Smith, the head professorship of mathematics in the University of Oxford, the Savilian Professorship of Geometry, became vacant, Sylvester hastened to apply for it, and no offers could retain him in America after his election to Oxford was announced.

That he still retains his affection for some of his American pupils and follows their work with interest, is hinted by his proposing the writers name to the London Mathematical Society, and by continued assurances of personal regard. Every American who now goes to Oxford should visit Newcollege, and try to catch at least a glimpse of this one of the Immortals, one who has done so much for America.